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# Systems Thinking at the Open University: 50-year celebration (OU Systems @50)

Ray Ison

Professor of Systems (ASTiP, School of Engineering & Innovation, The Open University)

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The Open University celebrates 50 years of Systems education development and provision in 2021 (now branded as STiP, systems thinking in practice). The OU is perhaps the largest and most experienced provider of STiP education and scholarship in the world (with a substantial archive accessible to the public). A series of activities to celebrate this achievement have begun through the auspices of ASTiP (Applied Systems Thinking in Practice) group in the School of Engineering and Innovation. OUSTiP@50 marks a significant unique coupling in 1971 between provision of Supported Open Distance Learning at the OU (from 1969) with tertiary level teaching of systems thinking in the UK and beyond.

## [Short History of STiP at the OU](#)

Open University (OU) Systems began in 1971 with the appointment of the first Chair of Systems (Professor John Beishon) and a group of Systems academics charged with starting a new Department and the development and teaching of a new subject. The first courses offered by supported distance learning began in 1973 with the completion of T241, Systems Behaviour. When the OU Systems Department was established, there were three other British universities offering systems based courses and degrees but all emphasising postgraduate education and research. Aston and City Universities were mostly focused on

engineering based 'hard' systems - operational research and management science, and mathematical modelling respectively.

Lancaster was the first to stress the shortcomings of 'hard' approaches when applied to management and human systems. It set an important precedent for the direction of soft systems thinking in UK universities, primarily through Peter Checkland's Soft Systems Methodology (SSM) and the influence of Geoffrey Vickers.

The OU Group combined both 'hard' and 'softer' approaches drawing upon contemporary understandings of Systems and Cybernetics and, thanks to the rigours of designing distance learning courses, contributed to further elaborating and systematising systems methodologies, including SSM (Beishon, 1980; Naughton, 1981). The Open University was the first to focus on undergraduate Systems teaching.

The Systems Department was conceived by the first Dean of Technology, Geoff Holister.

There were five professors in the original Faculty of Technology - Systems, Communications and Design, Engineering Mechanics, Materials, and Electronic Design (Holister, 1974).

Holister, an engineer, saw a need for technology and its design to take more account of the human and other contexts on which it depended and impacted. Systems and Design were therefore seen as key process-disciplines that were to work in close collaboration with the more conventional subject-disciplines of technology. They would contextualise and synthesise the subject-disciplines and act as catalysts for interdisciplinarity (Holister, 1974):

"I felt that a concern for and systematic study of the social and environmental aspects of technology was essential. Certainly environmental problems were approachable only by means of systemic and interdisciplinary methods and I felt convinced that any Faculty of technology that did not concern itself with such problems could not claim to be either modern or responsible, whether socially or academically" (this was in 1969 - before the environment had become a fashionable subject)

Systems, and Design and Communications were to start with:

"the broader concepts initially....Creative design (as distinct from the more formalised engineering development methodology often taught as engineering design) requires the generation in the student of an ability for synthesis (rather than analysis).....an area where traditional teaching methods have a doubtful validity".

With regard to Systems, Holister (1974) continued:

"Within the last fifty years....our progress appeared to be limited not by the availability of materials or sources of power but by our limited understanding of the very complexity of the systems we were developing. Most of the exciting developments in technology (general systems theory, cybernetics, etc.) seemed to me to be in this area of trying to understand and control complex systems".

The new Systems department would also take in engineering control theory and the newly developing management science.

From its inception, then, the role of the Systems Department was to encourage the specialist disciplines to take a more systemic approach to themselves and to the effects of their activities.

Systems was established as a distinct discipline to conform with existing academic structures and came to be viewed as a subject-discipline. But, its status as a subject-discipline is ambiguous, as any systems thinking practitioner (STP) can vouch for when asked to explain what, exactly, systems is. An answer as straightforward as describing, say, biology, engineering or philosophy is hard to give. The latter have domains of inquiry which are all socially accepted. The question strikes at the heart of the on-going challenge to institutionalise systems-as-discipline, meta-discipline or trans-discipline.

The OU can legitimately claim to have done a service to the systems community by clarifying systems concepts, and making them accessible and widely available. OU teaching materials were more structured, logical and comprehensible than any others before them as they were designed for students to use at home with little tutorial support. This revealed shortcomings in systems theory and practice, as John Beishon, the first Professor of Systems, described:

"(Teachers had to) examine and test the concepts, terms, methods, and processes involved in systems thinking in great detail. This revealed a disturbing amount of confusion and inconsistency in current systems terminology and practice and also an obscurity in much published material that led us to suspect that many writers did not understand their material. It also revealed a preoccupation with mathematical formulations.....which turned out to be based on dubious or trivial conceptual foundations" (Beishon, 1980).

From engagement, including surveys, with our alumni, we know that the clarity of OU systems teaching materials has had a great, sometimes revelatory, impact on students and

the ways they think about their problems and the world. This type of comment has been very common over our fifty years:

*"reflecting on my past work led me to take a completely different approach to my work (and myself!)"*. With regard to one course in particular, she continues, *"it has made an enormous difference in my life. I applied to tutor on it because I wanted to keep working on the course material"*.

Such sentiments are not uncommon, yet the Systems literature, with the exception of Salner (1986), is devoid of meaningful research which illuminates the effects of systems thinking and practices on individual learning or personal transformation.

In the 50 years of Systems-teaching endeavours at the OU the following courses or modules have been developed and presented (Figures 1 and 2). The data do not include the then Faculty of Technology Foundation (Level 1) course which contained Systems materials and was co-chaired for many years by Systems academics (student numbers on these courses were generally in the 4-5k per annum range). Some of the course detail for the systems and systems-related modules, including the Techno90logy Foundation courses, is provided in Table 1 (Appendix 1).

The STiP Group moved into PG education in the late 2000s with the first module presentations made in 2010 (TU811 and TU812) as part of a suite of PG awards (PG Cert, PG Dip and MSc STiP) with capstone subjects T847 or T802 – see

<https://www.open.ac.uk/stem/engineering-and-innovation/teaching/systems-thinking->

[practice](#), From 2010-2020 nearly 1100 students successfully completed each of the core STiP modules (Figure 3)

# OU Systems specific qualifications and modules

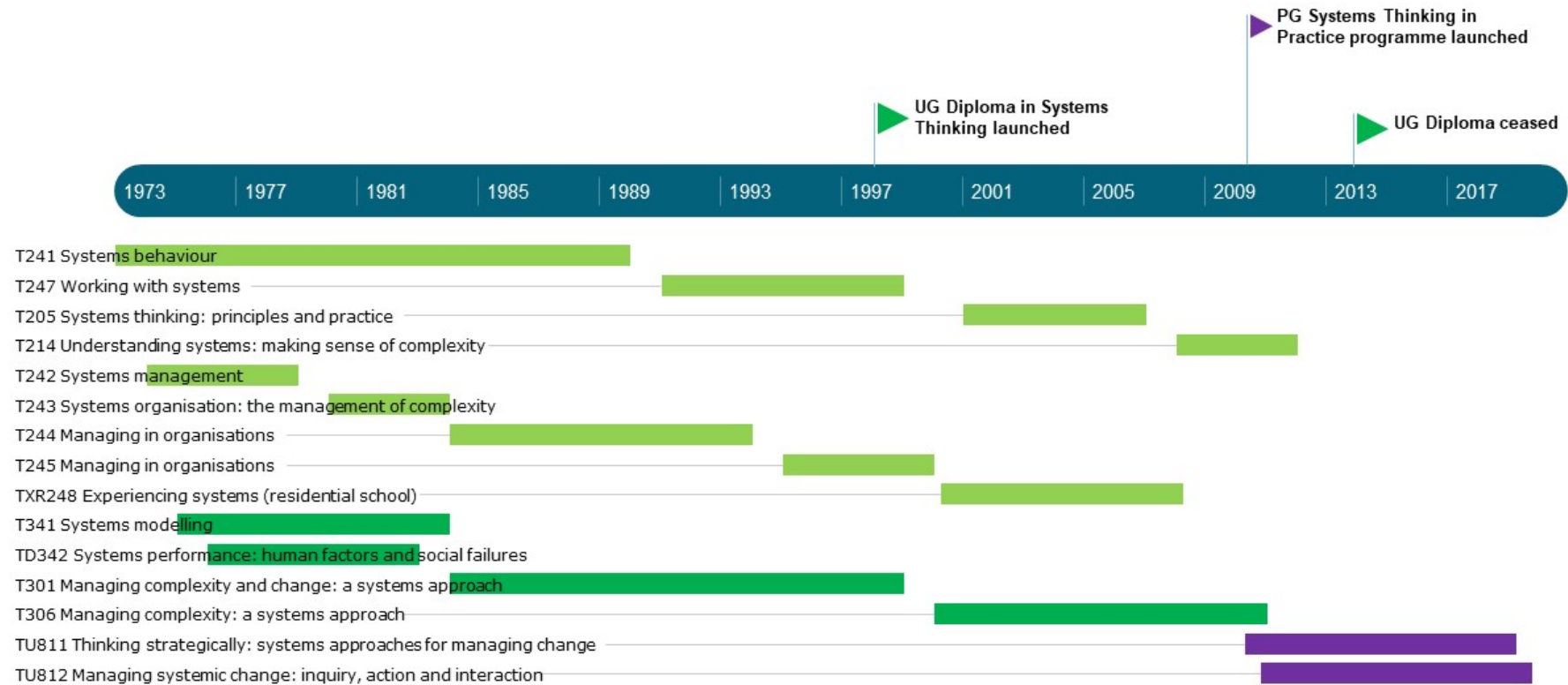


Figure 1. OU systems specific modules/courses and named awards developed and presented between 1971 and 2020



# OU domain focused modules underpinned by systems philosophy/approach

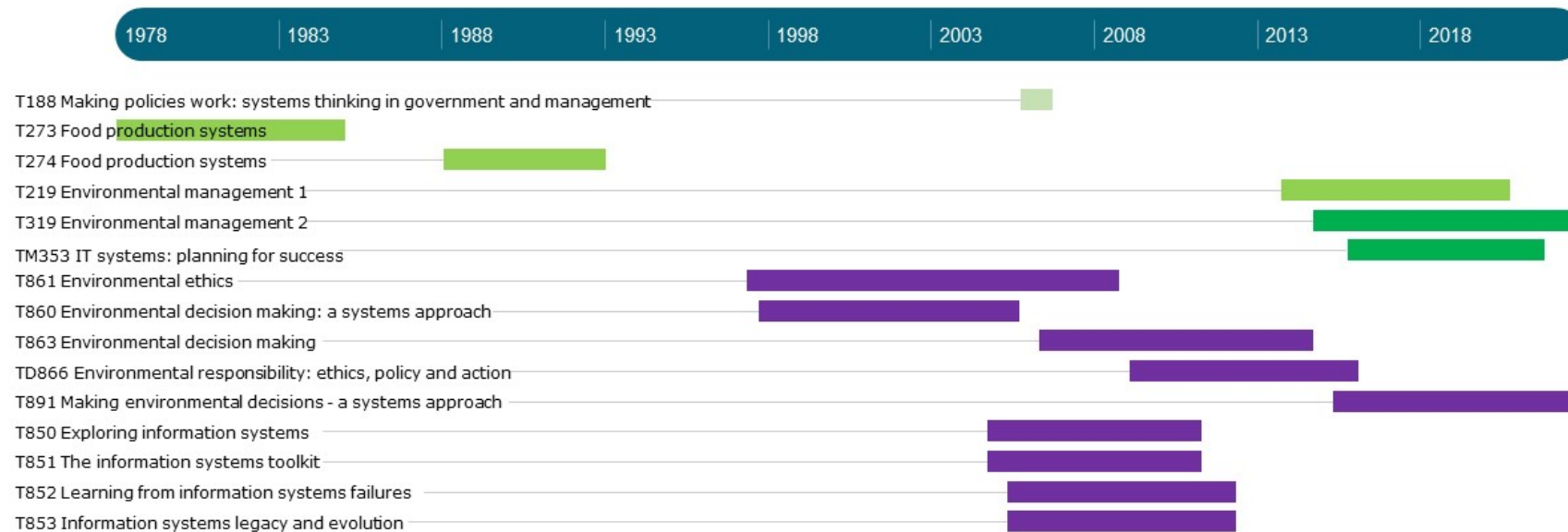
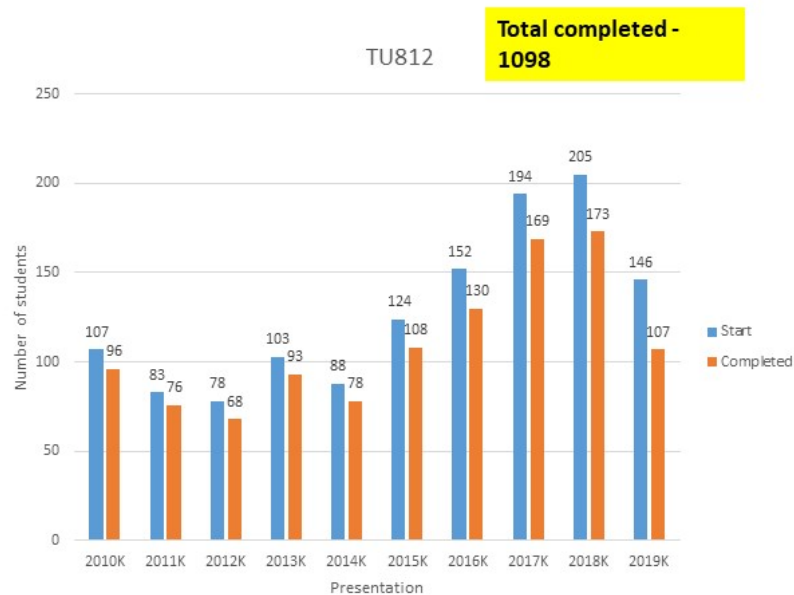
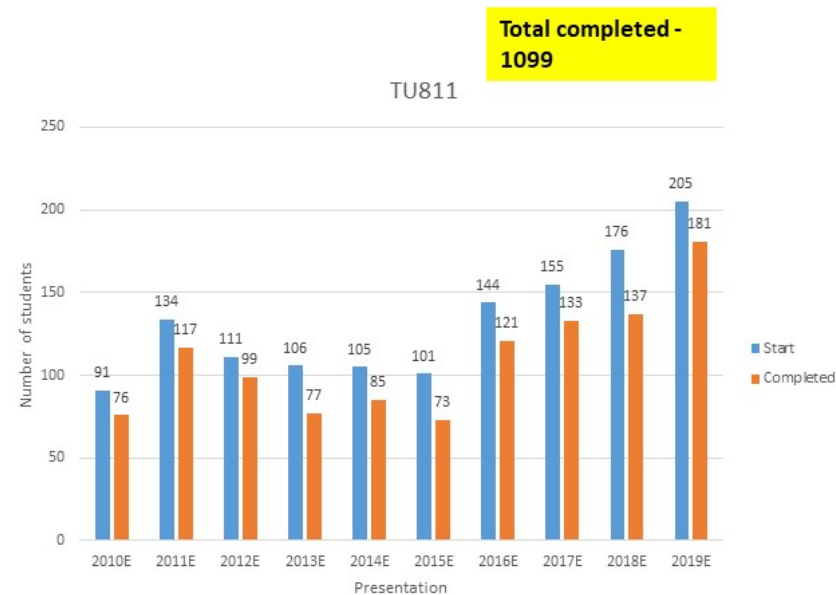


Figure 2. OU modules/courses developed by Systems academics dealing with the use/application of systems thinking in a range of different domains.

# STiP Program student numbers 2010-20



**Manging systemic change: inquiry, action..**



**Thinking strategically: systems tools...**

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Figure 3. Data for student enrolments and successful completions of the two core modules (2010-2020) in the OU's Systems Thinking in practice post-graduate programme. Completion of these two modules entitles the student to a PG Certificate in STiP. These two core modules have been replaced in 2020.

## References

Beishon, J. (1980). Learning about systems, *General Systems* XXV

Holister, G. S. (1974). A view from the technology Faculty. In Tunstall, J. (ed.), *The Open University Opens*, Routledge and Kegan Paul, London, pp. 149-152.

Salner, M. (1986). Adult cognitive and epistemological development in systems education. *Systems Research* 3, 225-232.

## Note.

Material here draws on the paper: Maiteny, P.T. & Ison, R.L. (2000) [Appreciating systems: critical reflections on the changing nature of systems as a discipline in a systems learning society](#). *Systems Practice & Action Research* 16 (4) 559-586. The full paper can be accessed on ORO at: [http://oro.open.ac.uk/173/1/SPAR\\_Ray\\_Ison\\_1.pdf](http://oro.open.ac.uk/173/1/SPAR_Ray_Ison_1.pdf)

**Table I: The history and contribution to Systems thinking of the Open University Systems Department's courses prior to 1996.**

## UNDERSTANDING SYSTEMS AND SYSTEMS THINKING

### ***Systems Behaviour (T241):*** 1973-90 (T247).

Emphasis on understanding and describing interactive behaviour of social, biological, economic, industrial and engineering systems developed through six case studies on aspects of Air Traffic Control, Industrial Social Systems, Planning Systems, UK Telephone System, Grassland Ecosystems, Human Respiratory System.

**Course reader:** *Systems Behaviour*, Open Systems Group (eds.), Harper and Row, 1981.

### ***Working with Systems (T247):*** 1991-1999 (T205)

Introduction to systems thinking, representation, modelling, diagramming, diagnosis, intervention. Topics include design of simple information system, ethical investment, ecology of a garden, how acupuncture works, and group decision-making. Blocks on Representing Systems, Diagnosis, Intervening in Systems and Systems Thinking. For working in a highly interdependent society.

### ***Food Production Systems (T273):*** 1978-85.

Production and supply of food on a world scale, its processes and likely future changes.

Interdisciplinary, incl. biology, chemistry, social, economic and political factors influencing organisation and control of the technical processes of food supply. Units on world food problem; human nutritional needs; maximisation of crop production; effects on food supply of using animals, micro-organisms, of foodstuff processing, producer and consumer demands, organisational contexts, politics and national priorities, world trade.

### ***Systems Modelling (T341):*** 1975-84 (T301).

Quantifying effects of complex decisions; mathematics in social and economic decision-making; emphasis on values and how model choice can disguise critical value judgements; skills and techniques in model-building; adequacy of quantitative methods to represent values; modelling community decisions and macro economics.

### ***Systems Performance: Human Factors and Systems Failures (TD342):*** 1976-83 (T301).

Socio-technical failures (small-scale accidents & large scale policy). Emphasis on relationship between failures and objectives/expectations of stakeholders. Analytical techniques; case studies of catastrophes, science policy, mental health provision and a Rapid Transit system; safety, effectiveness & reliability in design, including ergonomics.

**Course readers:** *Catastrophic Failures* by V. Bignell, G. Peters and C. Pym, Open University Press.

*Human Aspects of Man-made Systems* by S. C. Brown and J. N. T. Martin, Open University Press.

### ***Managing Complexity & Change. A Systems Approach (T301)*** 1984-1999 (T306)

Introduced students to systems methodologies for managing change and complexity viz. The Systems Failures Method (Fortune & Peters 1995); the Hard Systems Method and Soft Systems Methodology. Included set and free choice project options.

**Course text:** Carter et al (1984). *Systems Management & Change. A Graphic Guide*.

## TECHNOLOGY FOUNDATION

## MANAGING IN ORGANISATIONS - A SYSTEMS PERSPECTIVE

### ***Systems Management (T242):*** 1974-79 (T243).

Organisations as systems & their behaviour, illustrated with case studies. Conventional management functions, people management, socioeconomic aspects, goal-setting, conflicts, information and decision making.

### ***Systems Organisation: The Management of Complexity (T243):*** 1980-84 (T244).

'Knowing the system': Gaps between theory and practice. Intro. to systems ideas in organisational practices and effects; tools & strategies for avoiding traps due to preconceptions or oversimplification; themes of control, change and conflict, interdisciplinarity, need for "holistic", practical understanding, ability to use various frameworks and levels of analysis. Practical, work-based emphasis.

**Course reader:** *Organisations as Systems* by M. Lockett and R. Spear (eds.), Open University Press, 1980.

### ***Managing in Organisations (T244):***

1984-94 (T245).

Practical, "learning from experience" orientation; tools for tackling problems and 'messes' in organisations; intellectual and social aspects of problem-solving. Wider work context of relations, challenges & preconceptions about organisations.

**Course reader:** *Organisations: cases, issues, concepts* by Rob Paton et al. (Eds.), Harper and Row, 1984.

### ***Managing in Organisations (T245):*** 1995-.2000 (T205)

Up-dated version of T244; 'tools for thought' applicable to organisational matters and own organisational life; understanding organisational relationships; generating a more rounded understanding of and response to complicated issues. Units: Problems about organisations; Work groups (incl. group psychology); Organisations (structures, processes, power, conflict, decision-making; problem-solving); Inter-organisational relations (contexts, markets, patterns); Wider perspectives (new perspectives; case study); explains common organisational practices, eg. organisational development, management by objectives. **Course reader:** *Organizations - Cases, Issues, Concepts* by Rosalind Armonson and Rob Paton (Eds.), Paul Chapman, London, 1995.

## OTHER COURSES WITH SYSTEMS GROUP INPUT OR CONCEPTS

***The Man-made World (T100):*** 1971-79.

***Living with Technology (T101):*** 1980-88.

***Living with Technology (T102):*** 1988-98.

Technology in social and societal context incl. pollution, employment, energy, politics, economics, values, sustainability; skills for tackling complex problems, basic engineering, science, economics, learning & communication skills. **Course book:** *Fuel's Paradise: Energy Options for Britain* (2nd edition) by P. Chapman, Pelican, Harmondsworth, 1979.

**Note:** Several non-degree programme Study Packs have also been produced on Nature Conservation and Countryside Management and Interpretation.

***Manufacturing Technology (T355)***

Introduction to materials processing and broader issues associated with process selection and how they operate in a manufacturing environment.

***Manufacturing: Management and Technology Programme***

Structure and Design of Manufacturing Systems (PT611), Manufacturing Management (PT613), Implementation of New Technologies (PT621), Enterprise and the Environment (T830), Quality Management (T831), Quality Methods (T832), Project Management (PMT605), Human-Computer Interaction (PMT607), The Master of Science Degree Project (PT801).

***Third World Studies (U204):*** 1983-1991 (U208).

***Third World Development (U208):*** 1991-

Interdisciplinary problem-solving approach to development issues beyond traditional political economy approach. Strands: physical and social environment; cultural expression in literature and music related to social, political and economic life; gender relations and access to resources; technology and social change, building up capabilities in technology. Textbooks: Part 1: Poverty and Development in the 1990s: an Introduction. Part 2: Industrialisation and Development. Part 3: Rural Livelihoods: Crises and Responses. Part 4: Development Policy and Public Action. **Course readers:** *Third World Lives of Struggle* by H. Johnson and H. Bernstein (eds), Heinemann Education Books (revised ed.). *Nervous Conditions* by T. Dangarembga, The Women's Press (1988). *The Third World Atlas* by A. Thomas et al, Open University Press, (2nd edition, 1994). *The Hour of the Star* by C. Lispector, Carcanet (1992).

***Creative Management (B882):*** Business School MBA course.